

per billion. Assuming a continuous input of propellants at current consumption levels, that concentration will have risen 20 or 30 times, to 2 or 3 parts per billion by the year 2000. At 2 or 3 ppb, Ramanathan theorizes, the propellants will absorb enough radiant heat to cause an average global surface temperature increase of about 1.6 degrees F.

Linwood B. Callis, the head of the Langley Math Fluid Physics section and chief of the current project, says such a temperature increase, if it occurred, would be sufficient to cause some melting of the polar icecaps. But Langley's atmospheric model is a fairly simple, static one, that does not include several atmospheric feedback cycles. Ramanathan is not, therefore, making predictions of such effects, Callis says, but rather indicating that the physical effects of fluorocarbons on the troposphere must be considered as well as the chemical effects on the strato-

sphere. The group plans to use more complicated, dynamic atmospheric models in future studies, Callis says.

The Langley theory, Princeton atmospheric physicist Jerry Mallman cautions, is "very, very premature," and it is "perhaps a bit dangerous to talk at this point about greenhouse effects and polar icecap melting." Mallman says the Langley team is using the simplest one-dimensional model of atmospheric heat balance and projecting the effects—as accurate as these appear to be—onto the climate as a whole. "There are so many mitigating circumstances when it comes to climate," Mallman says, "the complicated interaction of the oceans, ice, clouds and atmospheric motion, that we just don't have any models that even come close to simulating the climate." There is just not enough known about atmospheric physics, he says, to really predict how the climate would respond to this infrared absorption. □

When should life be prolonged?

In this age of medical technology, physicians can sustain a patient's vital functions almost indefinitely with the use of machines. Thus profound legal, ethical and financial questions arise. Who has the right to decide when the plugs can be pulled? When should they be pulled? And who should pay for artificially extending life?

A highly publicized case before the Superior Court in New Jersey—the Karen Anne Quinlan case—may help decide the legal question. Whether the case will resolve the ethical and financial questions is more doubtful.

On April 14, 1975, 21-year-old Karen Quinlan went to bed and never awakened. The county prosecutor's office investigating the circumstances surrounding her illness thought that it possibly stemmed from an accidental overdose or the inadvertent interaction of a tranquilizer and alcohol. During the past five-and-a-half months, physicians at St. Clare's Hospital in Denville, N.J., have kept Karen alive on a respirator. The physicians have told Karen's parents, Joseph T. and Julia Ann Quinlan, that she has suffered irreversible brain damage and has no hope of recovering. But the physicians refuse to take her off the respirator because they fear a malpractice suit. Consequently the Quinlans have filed a civil court action seeking a court decision so that the respirator can legally be turned off.

This is the first time, with one possible exception, in which a court has been asked to decide whether guardians have the right to terminate artificial means of maintaining life. (It has been established legally that a conscious patient has the right to refuse treatment.) The case, scheduled to come to trial Oct. 20, promises to be lengthy and complex, involving lawyers for the state, county, hospital, physicians

and Karen Quinlan. The Quinlan's attorney, Paul W. Armstrong, argues that the Quinlans want to let their daughter die naturally with grace and dignity. New Jersey State Attorney General William F. Hyland argues that if the Quinlans are given the right to terminate life support, the decision opens the door to euthanasia.

In the view of Robert Veatch, staff director of the Research Group on Death and Dying of the Institute of Society, Ethics and the Life Sciences in Hastings-on-Hudson, N.Y., "this will be a very important case for setting public policy regarding guardian decision-making. If they decide that treatment cannot be stopped, that will, at least in New Jersey, set precedent. I suspect it will have an effect throughout the country. If they decide that parents can go ahead and refuse the treatment, that will be the first clear-cut case of guardian treatment refusal, with the possible exception of one case in Miami."

Whether the case will resolve the ethical question about when life should be terminated is more tenuous. The question is incredibly complex, and even physicians who are closely involved with it differ in their views. For example, Andre Hellegers, director of the Kennedy Institute for the Study of Human Reproduction and Bioethics, takes this stance on the Quinlan case: "Here is a woman who for 160 days and some is allegedly receiving therapy when it isn't doing her any good. The problem, I understand, is that she still has some brain waves so that she cannot be pronounced dead. I hope that nobody confuses the difficulty of defining death with the difficulty of whether one may let die, or whether one may kill, which is another notion altogether. But I don't see any ethical problem in this case. She is just being maintained by a machine which

is no good for her or for anybody else. I think we should let her go."

Jonathan H. Pincus, professor of neurology at Yale Medical School, isn't so sure: "In general we [at Yale] do not feel compelled to use respirators or any extraordinary means of keeping somebody alive if we feel it is hopeless. However, if Karen Quinlan has some sort of neurological brain function, it's hard to tell what's going to happen. There is every now and then a case reported of somebody who has survived in relatively good shape from something like that. So if there were any chance of that happening at all, it seems to me that you wouldn't want to throw in the towel. On the other hand, if there isn't any chance of this occurring, keeping somebody on a respirator for several months doesn't seem to be a very effective way of handling it, either."

Aside from the knotty legal and ethical questions surrounding the Quinlan case, there is also the tough financial question. Who should pay for extending patients' lives indefinitely? Lawyers have estimated that the bill for maintaining Karen Quinlan on artificial life support will cost between \$70,000 and \$130,000, and they say it is unclear how the bills will be paid. □

Novas: Swan song, catching a unicorn

As Nova Cygni 1975 continues to fade, further reports of variations in its light superimposed on the gradual decline continue to come in. T.E. Margrave and J.H. Doolittle of the University of Montana's Blue Mountain Observatory find a variation in blue and violet light consistent with that reported earlier by P. Tempesti, but no evidence of variation in ultraviolet. R.H. Koch and C.W. Armbruster of the Flower and Cook Observatory find variations of yellow and blue light with a period of about an hour.

Gerard de Vaucouleurs of the University of Texas has extrapolated the declining light curve of Nova Cygni 1975 and predicts the following magnitudes: Sept. 30, magnitude 8.0; Oct. 30, magnitude 9.0; Dec. 15, magnitude 10.0. Latest observed magnitude estimate, by P. Maley of Houston, was 7.2 on Sept. 24 (I.A.U. Circular 2839).

It's now official. The strange X-ray object in Orion, AO620-00 is being called a nova. It is Nova Monocerotis 1975, because, although people kept referring to Orion, its location (R.A. 6h 20.2 m, Dec. -0°21.2') is actually slightly over the border in Monoceros (I.A.U. Circular 2840). J.B. Oke and Jesse L. Greenstein of the Hale Observatories report an essentially flat spectrum that could come from a very hot source. Radio, optical and X-ray fluxes are all about the same, they say. K. Locher of Grüt-Wetzikon, Switzerland, reports the latest visual magnitude estimate, 11.6 on Sept. 14. □